

IN THE CLAIMS

Please amend the claims as follows:

1. 1. (Withdrawn) A method of p-type doping in ZnO comprising:
 2. forming an acceptor-doped material having ZnO under reducing conditions,
 3. thereby insuring a high donor density; and
 4. annealing the specimens of said acceptor-doped material at intermediate temperatures under oxidizing conditions so as to remove intrinsic donors and activate impurity acceptors.
1. 2. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a hydrogen containing atmosphere.
1. 3. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a non- hydrogen containing atmosphere.
1. 4. (Withdrawn) The method of claim 1, wherein said acceptor-doped material comprises a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited on said n-type ZnO layer.
1. 5. (Withdrawn) The method of claim 1, wherein said intermediate temperatures comprise a temperature range between 200 °C and 700 °C.
1. 6. (Withdrawn) A method of forming p-n junctions using p-type ZnO comprising:
 2. forming an acceptor-doped material having ZnO under reducing conditions,
 3. thereby insuring a high donor density; and

4 annealing the specimens of said acceptor-doped material at intermediate
5 temperatures under oxidizing conditions so as to remove intrinsic donors and activate
6 impurity acceptors.

1 7. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a
2 hydrogen containing atmosphere.

1 8. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a
2 non-hydrogen containing atmosphere.

1 9. (Withdrawn) The method of claim 6, wherein said acceptor-doped material comprises
2 a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited
3 on said n-type ZnO layer.

1 10. (Withdrawn) The method of claim 6, wherein said intermediate temperatures
2 comprises a temperature range between 200 °C and 700 °C.

1 11. (Currently Amended) A wide band gap semiconductor device comprising:
2 a substrate;
3 an annealed n-type ZnO layer directly positioned on said substrate, said annealed
4 n-type ZnO layer comprises Ga as a dopant to produce n-type conductivity; and
5 an annealed p-type ZnO layer directly positioned on said annealed n-type ZnO
6 layer, said annealed p-type ZnO layer comprises nitrogen deposited under hydrogen
7 reducing conditions as a dopant to produce p-type conductivity uses an intrinsic donor to
8 increase donor concentration and to obtain high impurity acceptor density of an acceptor
9 doped material, said intrinsic donor is removed during annealing.

1 12. (Previously Presented) The wide band gap semiconductor device of claim 11,
2 wherein said acceptor-doped material is exposed to a hydrogen containing atmosphere.

1 13. (Previously Presented) The wide band gap semiconductor device of claim 11,
2 wherein said acceptor-doped material is exposed to a non- hydrogen containing
3 atmosphere.

1 14. (Cancelled).

1 15. (Cancelled).

1 16. (Currently Amended) A p-n junction comprising:

2 a substrate;
3 an annealed n-type ZnO layer directly positioned on said substrate, said annealed
4 n-type ZnO layer comprises Ga as a dopant to produce n-type conductivity; and
5 an annealed p-type ZnO layer directly positioned on said annealed n-type ZnO
6 layer, said annealed p-type ZnO comprises nitrogen deposited under hydrogen reducing
7 conditions as a dopant to produce p-type conductivitylayer uses an intrinsic donor to
8 increase donor concentration as well as high impurity acceptor density of an acceptor
9 dope material, said intrinsic donor is removed during annealing.

1 17. (Previously Presented) The p-n junction of claim 16, said acceptor-doped material is
2 exposed to a hydrogen containing atmosphere .

1 18. (Previously Presented) The p-n junction of claim 16, wherein said acceptor-doped
2 material is exposed to a non- hydrogen containing atmosphere .

1 19. (Cancelled)

1 20. (Cancelled)